

whose prior status was "broken" and which is reported by the discover engine as being "new" is assigned a status of "suspect" in a corresponding history object.

By using separate stores for the SAN representation and the change history, indicia of changes in the topology can generated rapidly, without traversing the entire internal representation. Clearing of the change history can likewise be accomplished quickly, again, without traversing the internal representation.

In yet further aspects, the invention provides methods as described above in which tasks on the second queue derive not only from event notifications received from the detection service, but also from SAN operations, e.g., device labeling commands, requested by the system operator/administrator.

LUN Selection For File System Extension

Further aspects of the invention provide an improved SAN of type having one or more digital data processors, e.g., the aforementioned hosts, and one or more storage devices. At least a selected one of the hosts includes a file system that effects access by the host to assigned storage devices. This can be, for example, a conventional AIX or other host platform file system that oversees file and other data accesses between the host and those assigned devices. That host can be associated, according to these aspects of the invention, with lower and upper capacity bounds for purposes of file system extension. In response to a request by (or on behalf of) the selected

digital data processor for extension of the file system, the manager assigns one of more further storage devices to that digital data processor.

In related aspects, the invention provides a SAN of the type described above having a plurality of storage units and a plurality of host digital data processors coupled to those storage units via an interconnect. Agents associated with each of the hosts digital data processors identify attributes of any of (i) the associated host, (ii) the interconnect to which that host digital data processor is coupled, and (iii) storage units to which that host digital data processor is coupled. The agents also respond to assignment, by a manager digital data processor, of a storage unit to the associated host digital data processor(s) by preventing access by that host digital data processor to others of said storage units in the SAN. At least a selected one of the hosts includes a file system and is associated with lower and upper capacity bounds for purposes of file system extension, as described above. In response to a request by the agent of that host for extension of the file system, the manager assigns one of more further storage devices (e.g., from among a pool of storage devices accessible to that host and otherwise available for assignment to it) to that selected host digital data processor.

Further aspects of the invention provide a SAN as described above in which the manager responds to the file system extension request by identifying a storage device from among the plurality of further storage devices accessible to the first digital data processor having a capacity in a range between the lower capacity bound and the upper capacity bound (or, in the case of a striped RAID file system, a range between the lower capacity bound divided by (s) and the upper capacity bound divided by (s), where (s) is the number of stripes), and assigns that storage device

to the selected host digital data processor. Where more than one storage device meets these capacity criterion, the manager can assign to the selected host the storage device having the greatest capacity.

5 In related aspects, the invention provides a SAN as described above in which the manager responds to the file system extension request by identifying and assigning to the selected host a plurality of storage devices whose combined storage capacity that equals or exceeds the lower capacity bound (divided by (s), for a striped RAID file system). Such identification and assignment of multiple devices can be effected, for example, in instances where no single
10 storage device, itself, has adequate capacity. Moreover, where such identification and assignment is effected, the manager can select among the storage devices on the basis of decreasing size. Thus, it assigns storage devices with larger storage capacities before assigning those with smaller storage capacities.

15 Still further aspects of the invention provide SANs as described above in which the manager removes from selection any storage device whose assignment to the first digital data process, in response to a previous file extension request, had failed. Related aspects of the invention provide such SAN in which the manager assigns only storage devices of types, e.g., pre-selected by an operator/administrator or otherwise.

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Further aspects of the invention provide SAN, e.g., of the type described above, that assigns storage devices for purposes of file system extension based on a RAID file system type of the selected host digital data processor and, particularly, that determines a number of same-sized